

## **ABSTRACT**

The present invention is directed to porous composite materials comprised of a porous base material and a powdered nanoparticle material. The porous base material has the powdered nanoparticle material penetrating a portion of the porous base material; the powdered nanoparticle material within the porous base material may be sintered or interbonded by interfusion to form a porous sintered nanoparticle material within the pores and or on the surfaces of the porous base material. Preferably this porous composite material comprises nanometer sized pores throughout the sintered nanoparticle material. The present invention is also directed to methods of making such composite materials and using them for high surface area catalysts, sensors, in packed bed contaminant removal devices, and as contamination removal membranes for fluids.